



PATRICIA ZUBER

PALLADIUM

Element Symbol: Pd

Atomic Number: 46

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As early as the 1700s, Brazilian miners described a number of platinum-like metals, and palladium was discovered along with rhodium by English chemist William Hyde Wollaston (1766-1828). Wollaston had been studying ores, probably taken from South America. He did not announce this discovery in the scholarly world, as one should expect, but advertised it for sale in an anonymous handbill, placed in the window of the Soho mineralogical shop of Jacob Forster in April 1803.

The name palladium was taken from Pallas, an asteroid that had been discovered at about the same time, which was named after the epithet of the goddess Athena, acquired by her when she slew Pallas.

The abundance of palladium in the Earth's crust is estimated to be about 1 to 10 parts per trillion, making it one of the ten rarest elements found in the Earth's crust. The most extensive deposits have been found in Russia and South Africa, accounting for 93% of the world's production. Recycling is also a source of palladium, mostly from scrapped catalytic converters.

Palladium has a beautiful shiny finish that does not tarnish easily. The malleability of palladium is similar to that of gold. It can be hammered into sheets no more than about a millionth of a centimetre thick. These properties make it desirable in making jewellery and art objects. For example, palladium leaf is one of several alternatives to silver leaf used in manuscript illustration.

However, over half of the supply of palladium goes into catalytic converters, which convert up to 90% of harmful gases from auto exhaust into nitrogen, carbon dioxide and water. Palladium is found in many electronics applications including computers, mobile phones, low voltage electrical contacts, and LCD televisions. Palladium is also used as alloys in dentistry, surgical instruments, ball bearings, springs, balance wheels of watches, and astronomical mirrors. Chemical applications are becoming more prominent, such as catalyst in hydrogenation of unsaturated hydrocarbons, and the 2010 Nobel Prize in Chemistry was awarded to three chemists who have made major contributions to palladium catalysis. Palladium plays a key role in the technology used for fuel cells, which combines hydrogen and oxygen to produce water.

Palladium will absorb over 900 times its volume of hydrogen gas. The hydrogen is released again when the metal is heated, and, because palladium does not absorb any other gas, it can be used to purify hydrogen.

Australia produced some palladium bullion coins in an "Emu" series from 1995 to 1997. Four different mintings were done with variations on the Emu for each. The coins, both proof and bullion, are one troy ounce of 99.95% pure palladium with a face value \$A40. Australia marketed the first proof or collector version at \$A350.

Provided by the element sponsor Allan Carty

ARTISTS DESCRIPTION

Palladium is a soft silvery metal that can be beaten to a thin leaf that has been used in illuminated manuscripts. Other applications include jewellery and the balance wheels of watches. Using the bold colours and style of manuscript calligraphy, I created a design that includes a balance outline inset in a capital P and drawings of watch parts incorporating the numbers 46. I cut the design into a lino plate, printed a background and over printed the relief print colours separately.

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